

NOTE TO PTO PERSONNEL:
THIS PATENT APPLICATION IS BEING
FILED WITH SMALL ENTITY STATUS

1 **OPERATING DEVICE FOR A SCREWDRIVER**

2 **CROSS-REFERNECE TO RELATED APPLICATION**

3 This application is a Continuation-In-Part Application of Serial
4 No. 10/226,270, filed August 23, 2002, and entitled “OPERATING
5 DEVICE FOR A SCREWDRIVER”, now pending.

6 **BACKGROUND OF THE INVENTION**

7 1. Field of the Invention

8 The present invention relates to an operating device, and more
9 particularly to an operating device for a screwdriver.

10 2. Description of Related Art

11 A conventional operating device for a screwdriver in
12 accordance with the prior art shown in Fig. 7 comprises a pivot seat (50)
13 having two channels (51) defined and extending into the pivot seat (50)
14 from the outer periphery of the pivot seat (50). The two channels (51)
15 are parallel to each other. Two pawls (51) each is reciprocally received
16 in a corresponding one of the two channels (51) and partially extending
17 out of the pivot seat (50). An adjusting ring (60) is pivotally mounted
18 around the pivot seat (50). The adjusting ring (60) has two grooves (61)
19 longitudinally defined in an inner periphery of the adjusting ring (60)
20 and a guiding portion (62) formed on the inner periphery of the
21 adjusting ring (60) between the two grooves (61) of the adjusting ring
22 (60). The two grooves (61) are provided to selectively receive a distal
23 end of a corresponding one of the two pawls (51) to change the

1 operated direction of the screwdriver.

2 However, the pivot seat (50) has no enough space to centrally
3 define a through hole to receive a long tip because the pivot seat (50)
4 has two channels (51) defined therein such that the conventional
5 screwdriver is in a narrow-range.

6 With reference to Fig. 8, another ratchet screwdriver is shown.

7 The ratchet screwdriver includes a handle (not numbered) and an
8 operating device (80) mounted in and near a bottom of the handle. A
9 barrel (70) is rotatably and centrally received in the handle. The
10 operating device (80) is connected with the barrel (70) for selectively
11 driving the barrel (70). A switch (90) is mounted in the operating
12 device (80) and partially extending through the handle for user to
13 change the operated direction of the operating device (80). The
14 conventional screwdriver can be used with a long tip because the
15 operating device is mounted near the bottom of the handle and the
16 barrel (70) extends to the operating device (80).

17 However, to mount the operating device (80) near the bottom of
18 the handle for using with a long tip is an inconvenient design. The user
19 must move the screwdriver from one hand to another for adjusting the
20 switch (90) to change the operated direction of the screwdriver.

21 The present invention has arisen to mitigate and/or obviate the
22 disadvantages of the two conventional screwdrivers.

23 **SUMMARY OF THE INVENTION**

1 The main objective of the present invention is to provide an
2 improved operating device for a screwdriver that can be used with a
3 long tip.

4 To achieve the objective, the operating device in accordance
5 with the present invention comprises a body including a through hole
6 longitudinally and centrally defined in the body. The through hole has
7 an enlarged portion formed in one end of the body. A first channel is
8 defined in the body and corresponds to the enlarged portion of the
9 through hole. The first channel communicates with the enlarged portion
10 of the through hole. A second channel is defined in the body. The
11 second channel corresponds to the first channel and the enlarged
12 portion of the through hole. The second channel communicates with
13 the enlarged portion of the through hole. A barrel is partially and
14 pivotally received in the first through hole in the body. The barrel
15 includes a polygonal hole therein and centrally extending through the
16 barrel for receiving a long tip. A series of teeth is formed on an outer
17 periphery of the barrel and corresponds to the enlarged portion of the
18 through hole. A controller is pivotally mounted on the body for
19 controlling an operate direction of the screwdriver. The controller
20 includes a first pawl movably received in the first channel in the body
21 and selectively engaged to the series of teeth of the barrel to control the
22 operate direction of the screwdriver. The first pawl extends over the
23 body and has a first guide side formed on a free end of the first pawl. A

1 first resilient member is mounted in the first channel and abuts against
2 the first pawl to push the first pawl toward the series of teeth of the
3 barrel. A second pawl is movably received in the second channel in the
4 body and is selectively engaged to the series of teeth of the barrel to
5 control the operate direction of the screwdriver. The second pawl
6 extends over the body and has a second guide side formed on a free
7 end of the second pawl. A second resilient member is mounted in the
8 second channel and abuts against the second pawl to push the second
9 pawl toward the series of teeth of the barrel. A cover is pivotally
10 mounted to the body for driving the first pawl and the second pawl to
11 control the operate direction of the screwdriver. The cover has a clutch
12 attached to the cover. The clutch has a first side corresponding to the
13 first guide side of the first pawl and a second side corresponding to the
14 second guide side of the second pawl.

15 Further benefits and advantages of the present invention will
16 become apparent after a careful reading of the detailed description with
17 appropriate reference to the accompanying drawings.

18 **BRIEF DESCRIPTION OF THE DRAWINGS**

19 Fig. 1 is an exploded perspective view of a operating device for
20 a screwdriver in accordance with the present invention;

21 Fig. 2 is a cross sectional side plan view of the operating device
22 for a screwdriver of the present invention;

23 Fig. 3 is a first operational top plan view of the operating device

1 in Fig. 2;

2 Fig. 4 is a second operational top plan view of the operating

3 device in Fig. 2;

4 Fig. 5 is a third operational top plan view of the operating

5 device in Fig. 2;

6 Fig. 6 is a schematic view of the operating device in Fig. 2

7 showing the operating device secured on a handle of the screwdriver;

8 Fig. 7 is an exploded perspective view of a operating device for

9 a screwdriver in accordance with the prior art; and

10 Fig 8 is a cross sectional side plan view of a ratchet screwdriver

11 in accordance with the prior art.

12 DETAILED DESCRIPTION OF THE INVENTION

13 Referring to the drawings and initially to Figs. 1-3, a operating

14 device for a screwdriver in accordance with the present invention

15 comprises a body (1) adapted to be partially secured in a handle (4) of

16 the screwdriver, a barrel (2) partially and pivotally received in the body

17 (1) and a controller (3) pivotally mounted on the body (1) for

18 controlling an operated direction of the operating device.

19 The body (1) includes a first through hole (13) longitudinally

20 and centrally defined in the body (1). The body (1) includes a column

21 (11) adapted to be securely inserted into the handle of the screwdriver

22 and a pivot seat (12) integrally formed with the column (11). The first

23 through hole (13) has an enlarged portion (131) formed and

1 corresponding to the pivot seat (12). The pivot seat (12) has a first
2 channel (121) and a second channel (122) respectively defined in the
3 pivot seat (12) and corresponding to each other. The first channel (121)
4 and the second channel (122) correspond to and communicate with the
5 enlarged portion (131) of the through hole (13). A cutout (123) is
6 defined in an outer periphery the pivot seat (12) and extending to a top
7 of the pivot seat (12) between the first channel (121) and the second
8 channel (122). A blind hole (124) is radially defined in the outer
9 periphery of the pivot seat (12) and a first spring (125) is
10 compressively received in the blind hole (124). A steel ball (126) is
11 partially received in the blind hole (124) to compress the first spring
12 (125).

13 The barrel (2) includes a polygonal hole (21) longitudinally
14 defined in the barrel and centrally extending through the barrel (2). The
15 barrel (2) has a first end extending through the first through hole (13)
16 in the body (1) and a first annular groove (22) defined near the first end
17 of the barrel (2). A first C-shaped ring (221) mounted on the first
18 annular groove (22) after the first end of the barrel (2) extending
19 through the body (10) to hold the barrel in place. A series of teeth (23)
20 is formed on an outer periphery of the barrel (2) and corresponds to the
21 enlarged portion (131) of the through hole (13) in the body (1). The
22 series of teeth (23) has a diameter slightly smaller than that of the
23 enlarged portion (131) of the through hole (13) such that the series of

1 teeth (23) is rotatably received in the enlarged portion (131) of the
2 through hole (13) after the first end of the barrel (2) extending through
3 the body (1). The barrel (2) includes a second end and a second annular
4 groove (24) defined in the outer periphery of the barrel (2) between the
5 second end of the barrel (2) and the series of teeth (23).

6 The controller (3) includes a first pawl (31) and a second pawl
7 (32) respectively movably received in the first channel (121) and the
8 second channel (122) in the pivot seat (12). The first pawl (31) and the
9 second pawl (32) correspond to each other and are selectively engaged
10 to the series of teeth (23) of the barrel (2) to control the operated
11 direction of the barrel (2). The first pawl (31) has a first protrusion (311)
12 longitudinally extending therefrom over the pivot seat (12). The first
13 protrusion (311) has an inclined first guide side (312) formed thereon
14 and facing the second pawl (32). The second pawl (32) has a second
15 protrusion (321) extending therefrom over the pivot seat (12). The
16 second protrusion (321) has an inclined second guide side (322)
17 formed thereon and facing the first pawl (31). A second spring (33) is
18 compressively mounted between the first pawl (31) and one side of the
19 first channel (121), and a third spring (34) is compressively mounted
20 between the second pawl (32) and one side of the second channel (122).
21 The restitution force of the second spring (33) and the second spring
22 (34) pushes the first pawl (31) and the second pawl (32) toward each
23 other. A cover (35) is pivotally mounted around the pivot seat (12). The

1 cover (35) includes a skirt (351) mounted around the outer periphery of
2 the pivot seat (12) and a shoulder (352) radically extending from one
3 end of the skirt (351) opposite to the body (1) and defining a second
4 through hole (353) to allow the barrel (2) extending through the cover
5 (35). A second C-shaped ring (350) is mounted one the second annular
6 groove (24) to hold the cover (35) in place after the barrel (2)
7 extending through the cover (35). The cover (35) has a first recess (354)
8 defined in the shoulder (352) for receiving the first protrusion (311) of
9 the first pawl (31) and a second recess (355) defined in the shoulder
10 (352) for receiving the second protrusion (321) of the second pawl (32).
11 A clutch (356) is securely attached to the shoulder (352) between the
12 first recess (354) and the second recess (355) for driving the first pawl
13 (31) and the second pawl (32) to selectively engage to the series of
14 teeth (23). The width of the clutch (356) is gradually enlarged relative
15 to the barrel (2). The clutch (356) has a first side (3561) corresponding
16 to the first guide side (312) and a second side (3562) corresponding to
17 the second guide side (322). The cover (35) includes a stopper (357)
18 extending from the shoulder (352) and slidably received in the cutout
19 (123) in the pivot seat (12) to limit the rotating range of the cover (35).
20 A first indentation (358), a second indentation (359) and a third
21 indentation (360) are defined in an inner periphery of the skirt (351) to
22 partially receive the steel ball (126) for user to easily control the
23 rotating range of the cover (35).

With reference to Fig. 3, the first side (3561) and the second side (3562) respectively abut the first guide side (312) and the second guide side (322), the first pawl (31) and the second pawl (32) are respectively engaged to the series of teeth (23) and the steel (126) is partially received in the first indentation (358). Consequently, the screwdriver is used as a conventional screwdriver without operating device.

With reference to Fig. 4, the second pawl (32) is disengaged from the series of teeth (23) when the cover (35) is rotated toward the second pawl (32), the clutch (356) outwardly pushes the second pawl (32), the second guide side (322) is moved along the second side (3562) and the steel ball (126) is partially received in the second indentation (359). Consequently, the barrel (2) is only rotated along the arrow as shown in Fig. 4 and cannot be rotated back because the first pawl (31) abuts against the periphery of the first channel (121). The first pawl (32) is slightly pushed back relative to the skirt (351) and compresses the second spring (33) so that the first pawl always abuts the series of teeth (23) of the barrel (2) due to the restitution force of the second spring (33).

With reference to Fig. 5, the first pawl (31) is disengaged from the series of teeth (23) when the cover (35) is rotated toward the first pawl (31), the clutch (356) outwardly pushes the first pawl (31), the first guide side (312) is moved along the first side (3561) and the steel

1 ball (126) is partially received in the third indentation (360).
2 Consequently, the barrel (2) is only rotated along the arrow as shown in
3 Fig. 5 and cannot be rotated back because the second pawl (31) abuts
4 against the periphery of the second channel (122). The second pawl (31)
5 is slightly pushed back relative to the skirt (351) and compresses the
6 third spring (34) so that the second pawl (32) always abuts the series of
7 teeth (23) of the barrel (2) due to the restitution force of the third spring
8 (34).

9 With reference to Figs. 1 and 6, the series of teeth (12) in
10 accordance with the present invention is formed on the outer periphery
11 of the barrel (2) so that the polygonal hole (21) is easily longitudinally
12 defined in and extending through the barrel to receive a long tip and the
13 switch for controlling the operating device is disposed near the top of
14 the handle (4) of the screwdriver. Consequently, the operating device in
15 accordance with the present invention is a convenient design for user to
16 operate with a long tip and easily change the operate direction of the
17 screwdriver on which the operating device of the present invention is
18 mounted.

19 Although the invention has been explained in relation to its
20 preferred embodiment, it is to be understood that many other possible
21 modifications and variations can be made without departing from the
22 spirit and scope of the invention as hereinafter claimed.